RoHS2
COMPLIANT

Giantplus
Technology

# Specification of LCD Module

## Product No.: GP1335A1

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# 1. GENERAL DESCRIPTION

This product GPM1335A1 is 7.0 inch TFT LCM. TFT is a trans-missive type color active matrix liquid crystal display (LCD), which uses amorphous thin film transistor (TFT) as switching devices. TFT LCM is composed of a TFT LCD panel, driver IC, PCB, embedded LED driver,FPC, backlight and a bezel unit. The following table described the features of this product.
This GPM1335A1 datasheet is compliant with “Display_Generic Specification_ICO OPE 00649 V4.pdf” generic specification.
This GPM1335A1 datasheet has precedence on the “Display_Generic Specification_ICO OPE 00649 V4.pdf” generic specification in case a parameter is contained in both documents.

# 2. FEATURES

| | |
|---|---|
| Display Size | 7.0”, 800(W)x RGB x 480(H) |
| Display Mode | Active matrix TFT |
| | Normally white(TN), Transmissive type |
| Display Format | RGB vertical stripe subpixels aligned |
| Colors | 262K color |
| Interface type | R.G.B. 18bits interface, DE mode |
| Driver IC | ILI6122-9G+ILI5960-9G |
| Backlight color | White(LED*21)<br>(LED:45-11UMC-404289ETR8-T)/Everlight |
| Viewing Direction | 6 o’clock, Gray inversion direction<br>User application direction 12o’clock |
| Polarizer | Anti-glare |
| Weight | 175.27g |

# 3. MECHANICAL SPECIFICATION

| Item | Specifications | Unit |
|---|---|---|
| Bezel Dimensional outline | 164.9×100.0×5.7 | mm |
| Bezel Dimensional outline+Foam | 164.9×100.0×7.3 | mm |
| Active area | 154.08(W)×85.92 (H) | mm |
| Pixel Pitch | 0.1926(W)×0.1790(H) | mm |

- Without FPC
- Metallic Bezel/Frame is surface conductive

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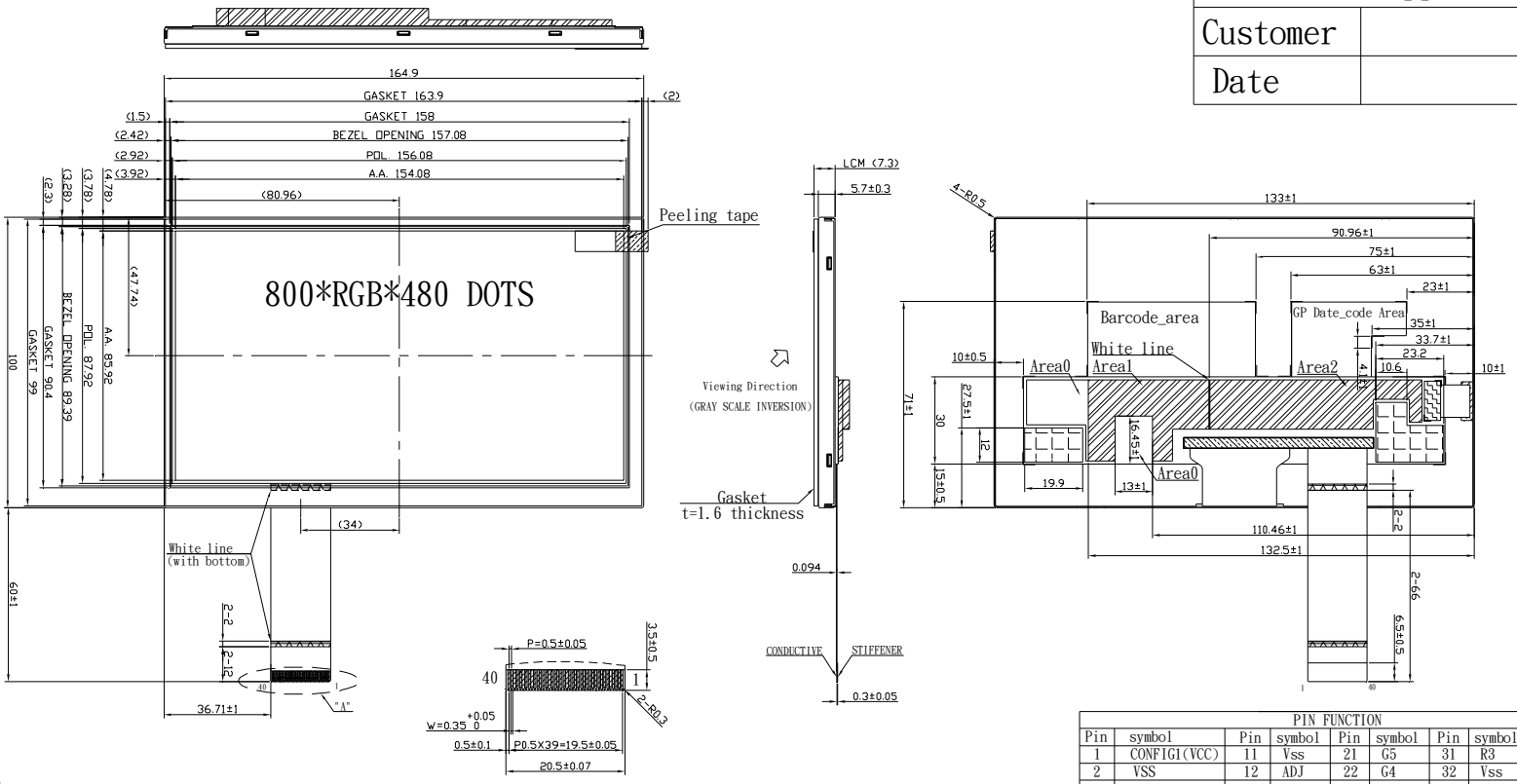
# 4. MECHANICAL DIMENSION

| Customer's Approval | |
|---|---|
| Customer | |
| Date | |




NOTE:

1. General Tolerance : +/-0.3mm
2. FPC contacts and the 2 "GND PADs" have to be in Ni/Au
3. Foam Poron 4701-40(Equivalent material)soft single side adhesive
4. Silicone applied to cover trace ,but NOT IC
5. FPC Bondings have to cover at maximum the pads and the rest of the pads must be covered with non-transparent silicone
6. Area0 : No components, H Max(= adhesive + PCB)=1.0mm
7. Area1 : H MAX(= adhesive + PCB + components) =2.6mm
8. Area2 : H MAX(= adhesive + PCB + components)=5.0mm
9. Gray scale inversion direction : 6 : 00 o'clock
10. Operating temperature : -20°C ~ 70°C
11. Storage temperature : -30°C ~ 80°C
12. Compatible with Molex 78119-1409 connector
13. No changes permitted without Ingenico review and consent
14. Metallic bezel must be surface conductive

GND PAD  Component Area

Mylar Tape  Silicone Area

PIN FUNCTION

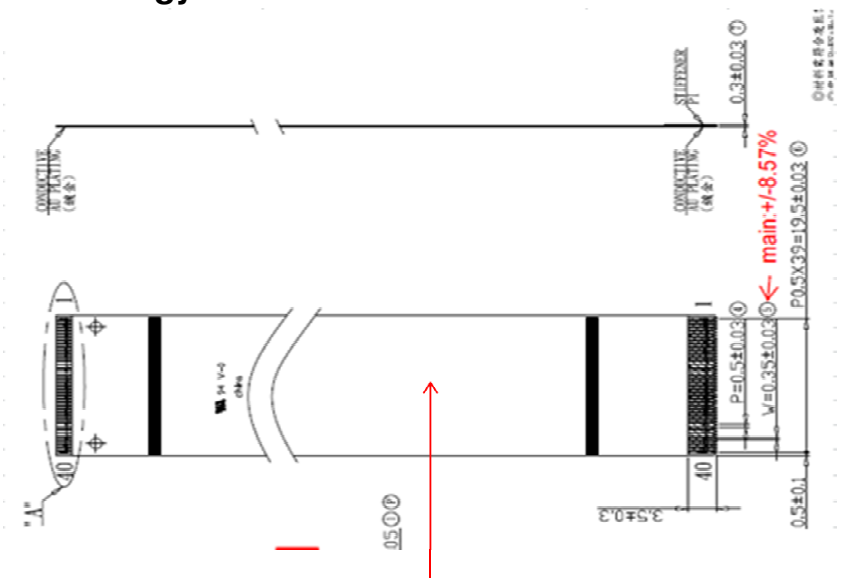
| Pin | symbol | Pin | symbol | Pin | symbol | Pin | symbol |
|---|---|---|---|---|---|---|---|
| 1 | CONFIG1(VCC) | 11 | Vss | 21 | G5 | 31 | R3 |
| 2 | VSS | 12 | ADJ | 22 | G4 | 32 | Vss |
| 3 | HSYNC | 13 | B5 | 23 | G3 | 33 | R2 |
| 4 | LED | 14 | B4 | 24 | Vss | 34 | R1 |
| 5 | LED | 15 | B3 | 25 | G2 | 35 | R0 |
| 6 | LED | 16 | Vss | 26 | G1 | 36 | Vss |
| 7 | VCC | 17 | B2 | 27 | G0 | 37 | Vss |
| 8 | VSYNC | 18 | B1 | 28 | Vss | 38 | DCLK |
| 9 | DE | 19 | B0 | 29 | R5 | 39 | Vss |
| 10 | Vss | 20 | Vss | 30 | R4 | 40 | CONFIG2(GND) |

| REVISED RECORD | |
|---|---|
| A | |
| B | |
| C | |
| D | |
| E | |

| | | | |
|---|---|---|---|
| SCALE | | TOLERANCE | ±0.3 |
| UNIT | mm | ORG DATE | 06.27.13 |
| MATERIAL | | DRAWN BY | JOE |
| | | CHECKED BY | |
| FINISH | | CONCURRED BY | |
| | | APPROVED BY | |

GIANTPLUS TECHNOLOGY CO.,LTD

| | | | |
|---|---|---|---|
| PROJECT NO: | LCM137029 | MODULE: | GPM1335A1 |
| DWG NO. | M1335A1 | DCN / A4 / VERSION | P 1 OF 1 / A |




| FPC Laminations | Thickness (um) |
|---|---|
| Polyimide Film | 25.4 |
| Adhesive | 25.4 |
| L1 Conductor (RA) | 17.8 |
| Polyimide Film | 25.4 |
| Total Thickness | 94±30 |

Note : FPC stackup was provided by FPC supplier.

# 5. MAXIMUM RATINGS

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently GND=0V,Ta=25℃

| Item | Symbol | Min | Max | Unit | Note |
|---|---|---|---|---|---|
| System Supply Voltage | VCC | -0.5 | 5.0 | V | |
| Input Logic Voltage | Vin | -0.3 | VCC +0.3 | V | |
| Power supply for LED driver | VLED | -0.5 | 5.5 | V | |
| Operation Temperature | $T_{op}$ | -20 | 70 | ℃ | Note1 |
| Storage Temperature | $T_{stg}$ | -30 | 80 | ℃ | Note1 |
| Storage Humidity | Hstg | 10 | 90 | %RH | Note1 |
| Operation Humidity | Hop | 10 | 90 | %RH | Note1 |

Note1：If users use the product out off the environmental operation range（temperature and humidity），it will have visual quality concerns.

# 6. ELECTRICAL CHARACTERISTICS

## 6.1. LCM ELECTRICAL CHARACTERISTICS

a. Typical operating conditions GND=0V,Ta=25℃

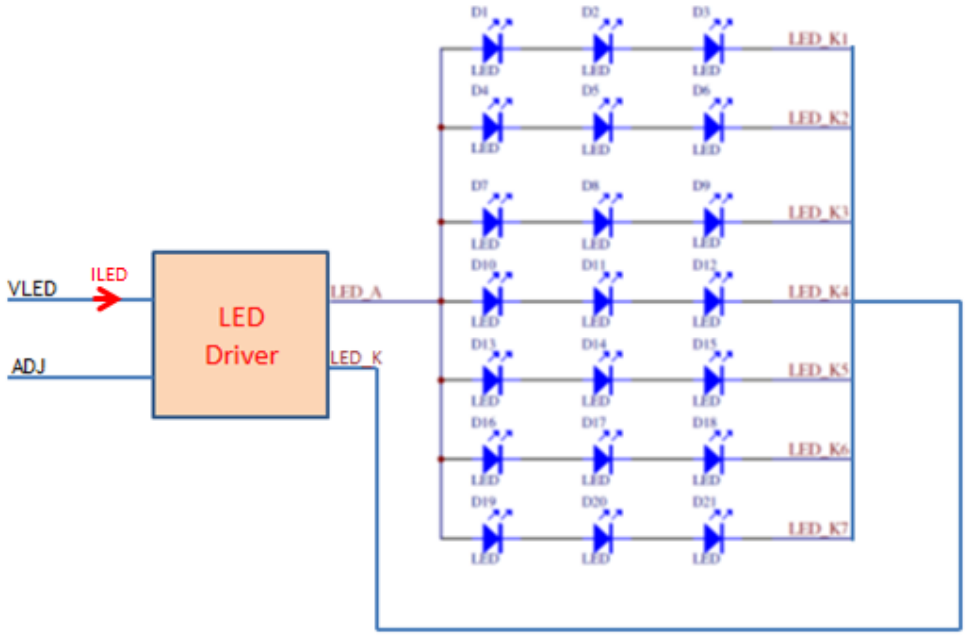
| Item | | Symbol | Values | | | Unit | Remark |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Power Supply for LCD | Voltage | $V_{CC}$ | 3.0 | 3.3 | 3.6 | V | |
| | Current | $I_{CC}$ | | 110 | 140 | mA | @VCC=3.3V Note3 |
| Logic input voltage | H level | $V_{IH}$ | 0.7$V_{CC}$ | - | $V_{CC}$+0.3 | V | |
| | L Level | $V_{IL}$ | -0.3 | - | 0.3 $V_{CC}$ | V | |
| Power Supply for LED Driver | Voltage | $V_{LED}$ | 4.5 | 5 | 5.5 | V | |
| | Current | $I_{LED}$ | | 330 | 400 | mA | @VLED=5V Note3 |
| ADJ frequency | | $f_{ADJ}$ | 19 | 20 | 21 | KHz | Note1 |
| ADJ input voltage | H level | $V_{IH}$ | 0.7$V_{CC}$ | - | $V_{CC}$+0.3 | V | |
| | L Level | $V_{IL}$ | -0.3 | - | 0.3 $V_{CC}$ | V | |
| LED decay life time | | | 27K | 50K | - | Hrs | Note2 |

Note 1: The larger of the pulse duty is, the higher is the brightness.
Note 2: (MTBF) The "LED decay life time" is defined as the brightness decrease to 50% original Brightness that the ambient temperature is 22℃ and LED dice current=20mA.
Note 3 : At Maximum brightness : ADJ=100% and LED dice current is 20mA

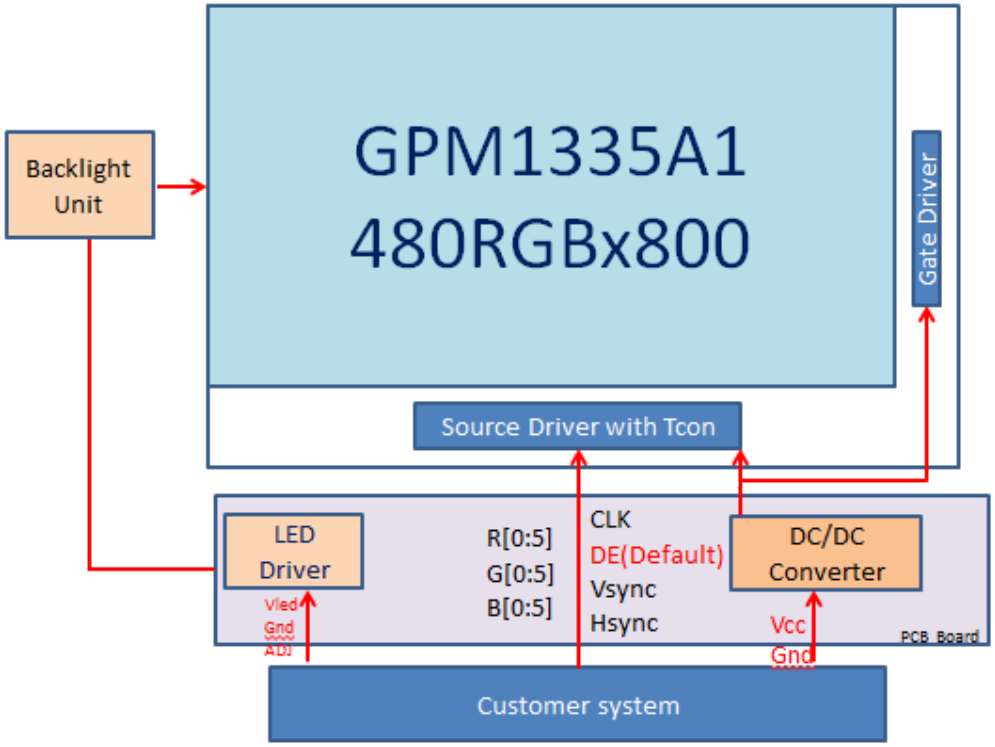
## 6.2. BACKLIGHT CHARACETRISTIC

| Item | Symbol | Min. | Typical | Max. | Unit |
|---|---|---|---|---|---|
| Voltage (One LED) | Vf | | 3.3 | 3.4 | V,@$I_F$=20mA |
| Current (One LED) | $I_f$ | --- | 20 | 30 | mA/Pcs |
| Number of LED ★1 | --- | | 21 | | Piece |

★ 1 BACKLIGHT Block diagram :



### 6.3. Block diagram




# 7. MODULE FUNCTION DESCRIPTION

## 7.1. LCM Pin Description

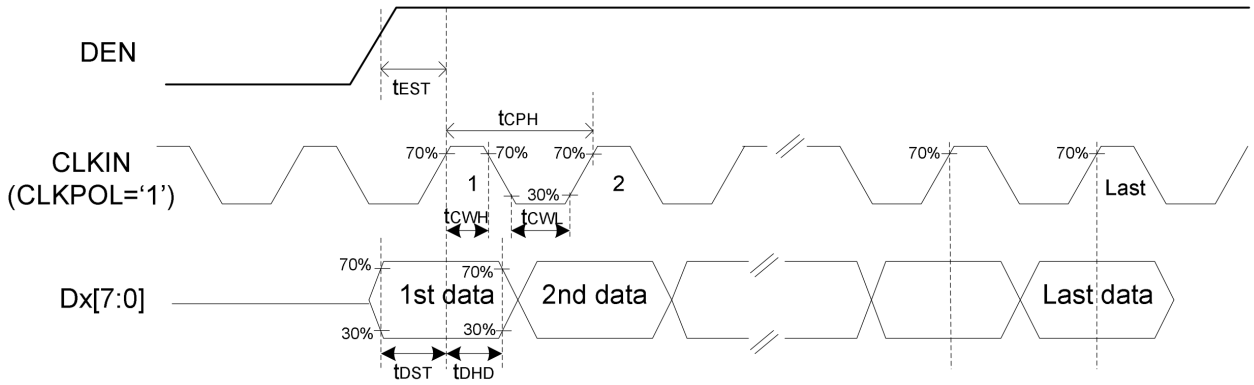
| Pin | Symbol | Description | Remark |
|---|---|---|---|
| 1 | Config1 (Vcc) | Internal pull high | |
| 2 | GND | Ground | |
| 3 | Hsync | Horizontal sync signal , active low | |
| 4 | Vled (5V) | Power supply input for backlight | |
| 5 | Vled (5V) | Power supply input for backlight | |
| 6 | Vled (5V) | Power supply input for backlight | |
| 7 | Vcc | +3.3V power source | |
| 8 | Vsync | Vertical sync signal , active low | |
| 9 | DE | Input data enable control , active high | Default mode |
| 10 | Vss | Ground | |
| 11 | Vss | Ground | |
| 12 | Adj | Backlight Enable | |

| | | | |
|---|---|---|---|
| 13~15 | B5~B3 | Blue data | |
| 16 | Vss | Ground | |
| 17~19 | B2~B0 | Blue data | |
| 20 | Vss | Ground | |
| 21~23 | G5~G3 | Green data | |
| 24 | Vss | Ground | |
| 25~27 | G2~G0 | Green data | |
| 28 | Vss | Ground | |
| 29~31 | R5~R3 | Red data | |
| 32 | Vss | Ground | |
| 33~35 | R2~R0 | Red data | |
| 36~37 | Vss | Ground | |
| 38 | DCLK | Clock signal to sample each data | Rising edge |
| 39 | Vss | Ground | |
| 40 | Config2 (GND) | Internal pull low | |

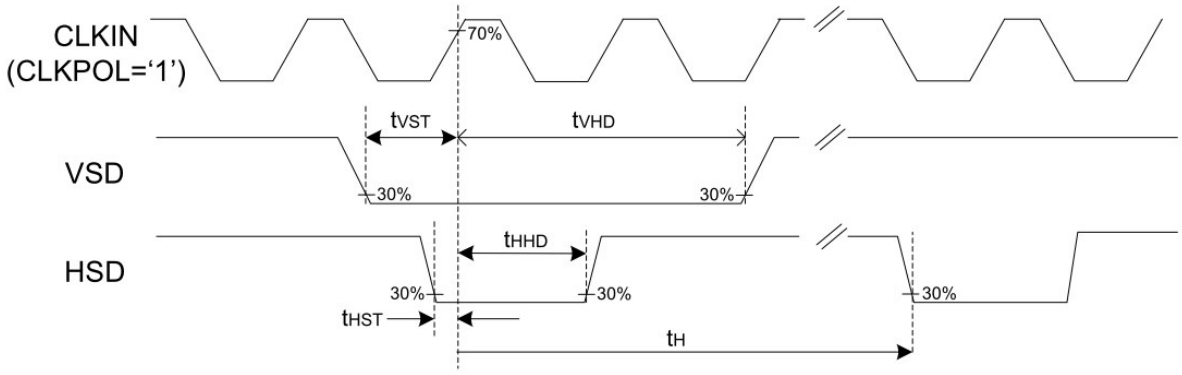
## 7.2. LCD Timing Characteristics(800*480)

**AC Timing characteristics**

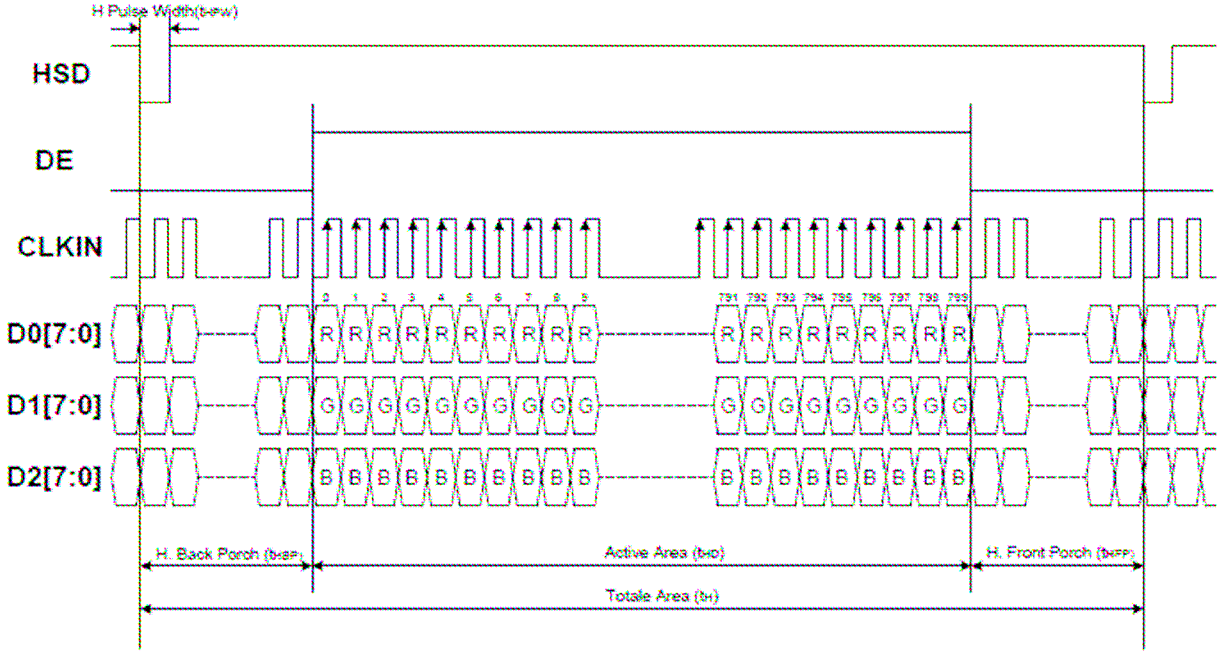
**DE Mode (MODE='1')**



## SYNC Mode (MODE='0')

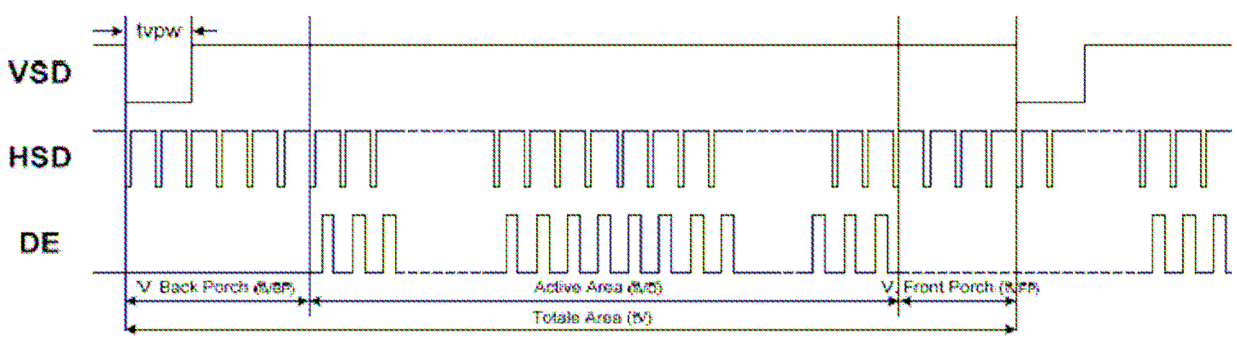



| Parameter | Symbol | Spec | | | Unit | Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| VDD Power ON slew rate | $t_{POR}$ | -- | -- | 20 | ms | 0V ~ 0.9VDD |
| VSD setup time | $t_{VST}$ | 8 | -- | -- | ns | |
| VSD hold time | $t_{VHD}$ | 8 | -- | -- | ns | |
| HSD setup time | $t_{HST}$ | 8 | -- | -- | ns | |
| HSD hold time | $t_{HHD}$ | 8 | -- | -- | ns | |
| Data setup time | $t_{DST}$ | 8 | -- | -- | ns | D0[7:0], D1[7:0], D2[7:0] to CLKIN |
| Data hold time | $t_{DHD}$ | 8 | -- | -- | ns | D0[7:0], D1[7:0], D2[7:0] to CLKIN |
| DE setup time | $t_{EST}$ | 8 | -- | -- | ns | |
| DE hold time | $t_{EHD}$ | 8 | -- | -- | ns | |
| CLKIN frequency | $f_{CLK}$ | -- | 40 | 50 | MHz | VDD=3.0 ~ 3.6V |
| CLKIN cycle time | $t_{CLK}$ | 20 | 25 | -- | ns | |
| CLKIN pulse duty | $t_{CWH}$ | 40 | 50 | 60 | % | $T_{CLK}$ |




**Horizontal Input Timing**

| Parameter | | Symbol | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Horizontal display area | | $t_{HD}$ | -- | 800 | -- | CLKIN |
| CLKIN frequency | | $f_{CLK}$ | -- | 33.3 | 50 | MHz |
| 1 Horizontal line period | | $t_H$ | 862 | 1056 | 1200 | CLKIN |
| HSD pulse width | Min. | $t_{HPW}$ | -- | 1 | -- | CLKIN |
| | Typ. | | -- | -- | -- | CLKIN |
| | Max. | | -- | 40 | -- | CLKIN |
| HSD back porch | SYNC | $t_{HBP}$ | 46 | 46 | 46 | CLKIN |
| HSD front porch | SYNC | $t_{HFP}$ | 16 | 210 | 354 | CLKIN |



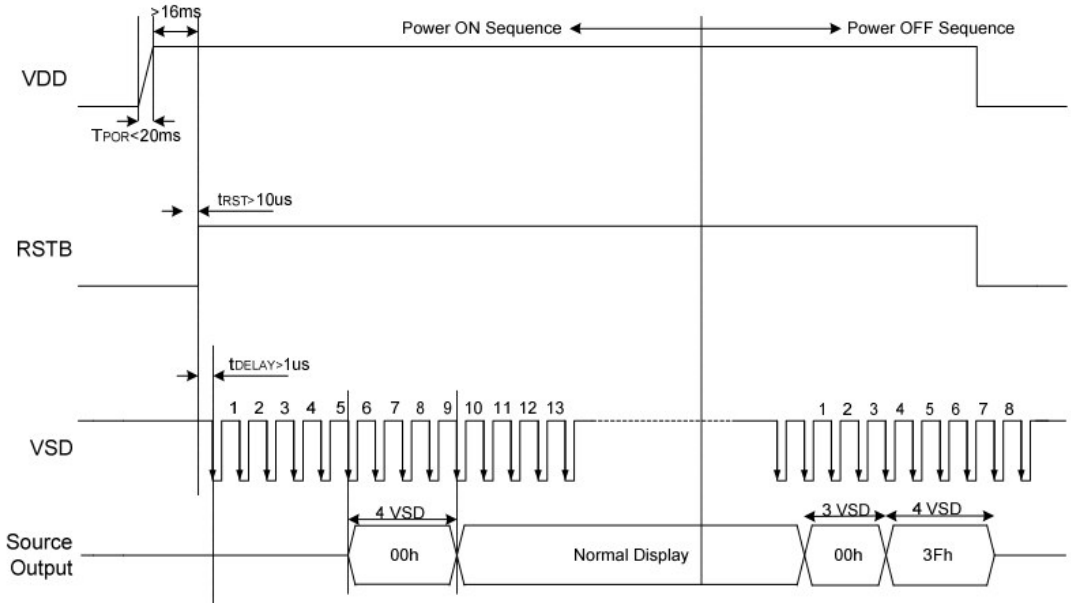

**Vertical Input Timing**

| Parameter | Symbol | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Vertical display area | $t_{VD}$ | -- | 480 | -- | HSD |
| VSD period time | $t_V$ | 510 | 525 | 650 | HSD |
| VSD pulse width | $t_{VPW}$ | 1 | -- | 20 | HSD |
| VSD back porch | $t_{VBP}$ | 23 | 23 | 23 | HSD |
| VSD front porch | $t_{VFP}$ | 7 | 22 | 147 | HSD |

## 7.3. Power Sequence

Power On：VDD→Video &Logic Signal

Power Off：Video &Logic Signal→VDD



# 8. ELECTRO -OPTICAL CHARACTERISTICS

(Test condition : Ambient Temperature=25℃,VDD=3.3V,VLED=5V,GND=0V,ADJ=100%)

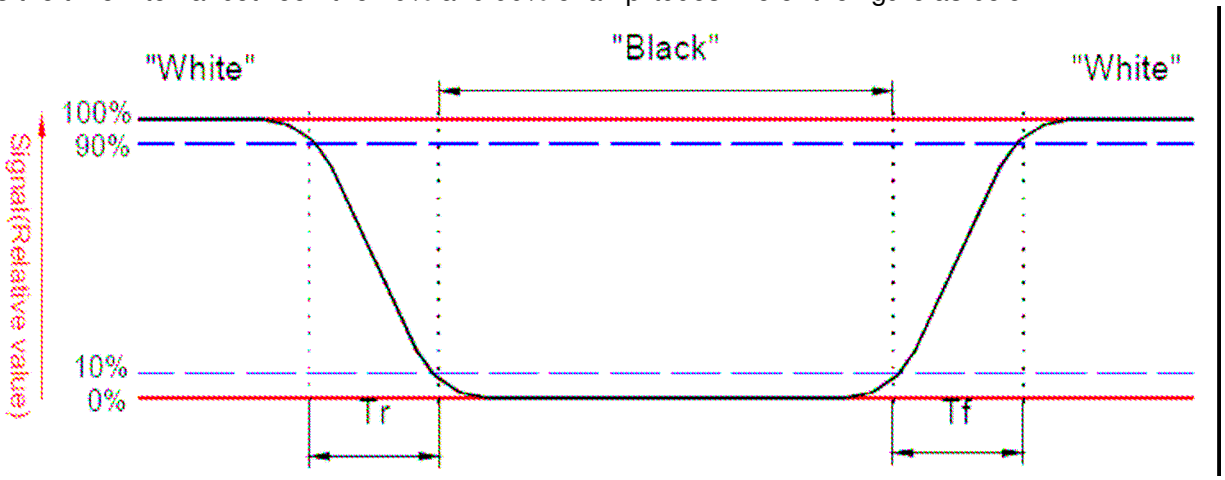
| Parameter | | Symbol | Min. | Typ. | Max. | Units | Note |
|---|---|---|---|---|---|---|---|
| Brightness | | Lwh | 350 | 420 | 450 | cd/m$^2$ | □=0°,Note 1 |
| Contrast Ratio | | CR | 400 | 500 | - | - | □=0°,Note1, Note6 |
| Response Time | | Tr+Tf | --- | 25 | 30 | ms | □=0°,Note 2 |
| NTSC | | | 45 | 50 | 55 | % | □=0°,Note1 |
| Chromaticity | Red | X | 0.564 | 0.604 | 0.644 | | □=0°,Note1 |
| | | Y | 0.301 | 0.341 | 0.381 | | |
| | Green | X | 0.339 | 0.379 | 0.419 | | |
| | | Y | 0.524 | 0.564 | 0.604 | | |
| | Blue | X | 0.119 | 0.159 | 0.199 | | |
| | | Y | 0.079 | 0.119 | 0.159 | | |
| | White | X | 0.285 | 0.325 | 0.365 | | |
| | | Y | 0.291 | 0.331 | 0.371 | | |
| Viewing Angle （with Polarizer） | Y axis down (ψ=180°) | $\phi_L$ | 50 | 60 | --- | Degree | CR>10 Note 5 |
| | Y axis up (ψ=0°) | $\phi_H$ | 50 | 60 | --- | | |
| | X axis right (ψ=90°) | $\theta_R$ | 60 | 70 | --- | | |
| | X axis left (ψ=270°) | $\theta_L$ | 60 | 70 | --- | | |
| Image Sticking | | 2 hrs | | | 2 | s | Note 4 |
| Flicker | | - | | | -24 | dB | |
| LCM Surface brightness uniformity | | $L_D$ | 80 | 85 | | % | □=0°,Note 3 |

## Note 1:

The optical characteristics should be measured in dark room (less than 5 lux). After 5 minutes operation, the optical properties are measured at the center point of the display. All input terminals display must be ground when measuring the center area of the panel. Photo-detector is placed vertically at 50 cm from display.

## Note 2:

The output signals of photo detector are measured when inputs signals are changed from “black” to “white” (falling time) and from “white” to “black” (rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer the figure as below :



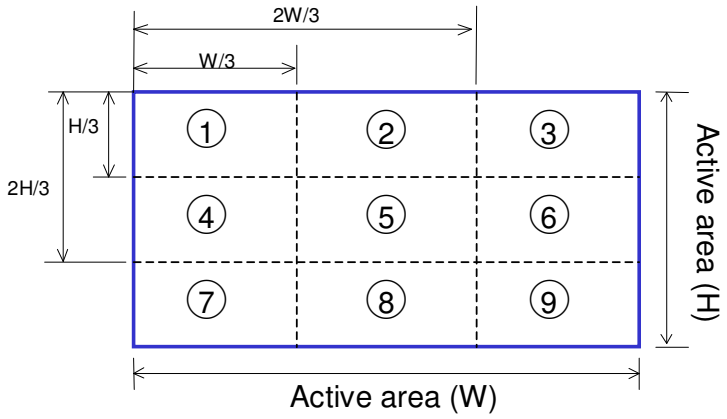

## Note 3

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

Brightness Uniformity (U)=Lmin / Lmax

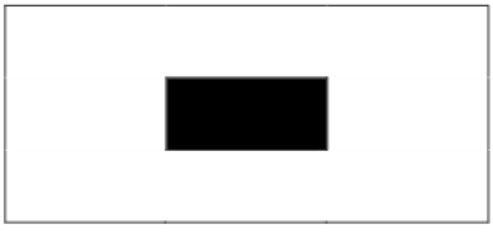
H : Active area height

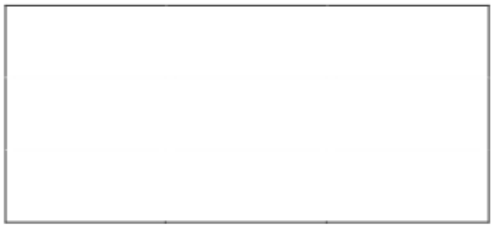
W : Active area width




## Note 4:

Continuously display the test pattern (black rectangle in the middle of display) for 2 hours, and then display a full white screen. The black rectangle should not persist more than 2 seconds





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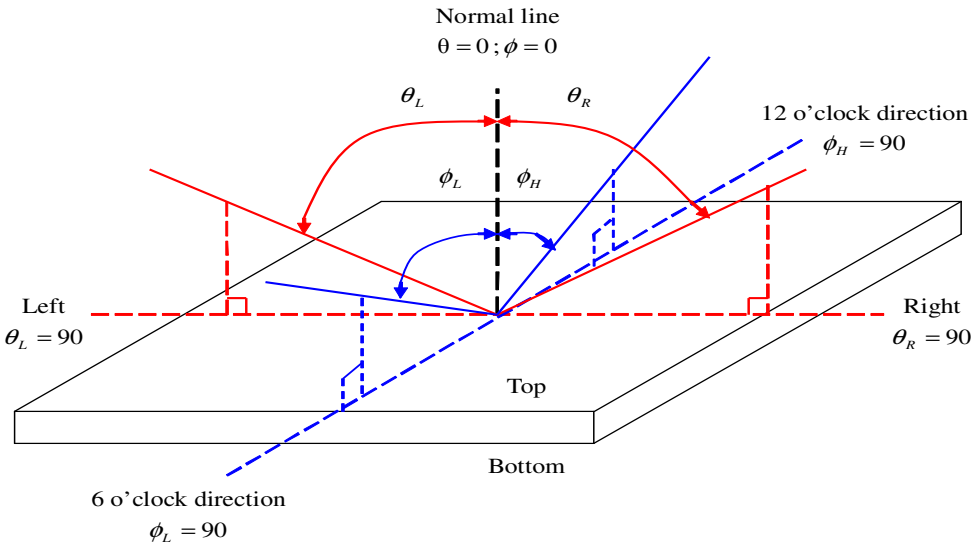
## Note 5:

Refer the figure as below.




## Note 6:

Contrast ratio is calculated with the follow formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

# 9. RELIABILITY Test

At the end of each test, the display shall be operational and compliant to the initially specified optical, electrical and mechanical requirements.

## 9.1. MTTF

The LCD module shall be designed to meet a minimum MTTF value of 100,000 hours with normal condition. (25℃ in the room without sunlight; not include life time of backlight)

## 9.2. Climatic tests

| No. | ITEM | CONDITIONS | STANDARD |
|---|---|---|---|
| 1 | High Temperature Operating | +70℃ 240Hrs | IEC60068-2-1 GB2423.2 |
| 2 | Low Temperature Operating | -20℃ 240Hrs | IEC60068-2-1 GB2423.1 |
| 3 | High Temperature Storage | +80℃ 240Hrs | IEC60068-2-1 GB2423.2V |
| 4 | Low Temperature Storage | -30℃ 240Hrs | IEC60068-2-1 GB2423.1 |
| 5 | High Temperature/Humidity Storage Test | +60℃ 90%RH 240Hrs | IEC60068-2-78 GB/T2423.3 |
| 6 | Thermal Shock Test Storage | -30℃(60Min)←5Min→+80 (60Min),100 Cycles | Start with Low temperature, End with High temperature, IEC20068-2-14,GB2423.22 |

Notes:
1. The tests No.1& No.2 will be performed individually on 3 pieces of sample. (3 pieces/test)
2. 3 pieces of sample undergo the tests No.3~No.6.
3. The color fade of polarizer should not care.
4. All the reliability testing chambers are using D. I. water.
5. All detailed descriptions will be described in “Display_Generic_Specification_ICO OPE 00649 V4.pdf” generic specification.

## 9.3. ESD tests

| ESD Immunity | Reference Standard | Limit Level | Performance Criteria | Application Test | Display only | Product(Operating for supplier info) |
|---|---|---|---|---|---|---|
| Human body model (non operational) | IEC 62179 | 2KV | No Damage | All relevant pin combinations | X | |
| Machine Model (non operational) | IEC 62180 | 200V | No Damage | All relevant pin combinations | X | |
| Contact Discharge (operational) | IEC61000-4-2 | 2KV | No Damage | All relevant pin combinations | X | |
| Air Discharge (operational) | IEC61000-4-2 | 4KV | No Damage | All relevant pin combinations | X | |
| Air Discharge (operational) | IEC61000-4-2 | 15KV | No Damage | On the external face of the terminal | | X |

Notes:
1. In the case of malfunction defect caused by ESD damage, if it would be recovered to normal state after software resetting, it would be judged as a good part.
2. All detailed descriptions will be described in “Display_Generic_Specification_ICO OPE 00649 V4.pdf” generic specification.

## 9.4. Mechanical tests

| Field | Condition | Standard |
|---|---|---|
| Vibrations | • 5 to 9 Hz 6.2mm<br>• 9 to 200 Hz 1G<br>• 200 to 500 Hz 1,5G<br>Duration : 10 sweeps per axis, on 3 axes, at 1 octave per min. | IEC 68-2-6 |
| Low atmospheric pressure | 25℃ ; 84kPa ; 4 hours | IEC 68-2-13 |
| Bumps | • Duration 6 ms<br>• Peak :392 $m/s^2$<br>number : 1000±10( vertical axis) | IEC 68-2-29 |

Notes:
1. All detailed descriptions will be described in “Display_Generic_Specification_ICO OPE 00649 V4.pdf” generic specification.

# 10. INSPECTION CRITERIA

## 10.1.Inspection Conditions

Inspection direction should be perpendicular to display surface within the viewing angle as per signed specification.

Inspection shall be performed under the conditions from 20W to 80W (from 300 TO 700 Lux) : fluorescent lamp ; parts will be held such that the light is not reflecting directly to the viewer.

Ambient temperature : 25/±5℃.

The distance between inspector's eyes and product surface should be from 30 cm to 50 cm maximum in all directions.

Time for cosmetic inspection is limited to 10 seconds for the screen and 10 seconds for other area. This does not include functional check.

Functional test must be made by using a specific jig provided by Giantplus.(One jig for Ingenico R&D, one jig for EMS)

## 10.2.Classification Of Defects

Major defect

A major defect refers to a defect that may substantially degrade usability for product applications.

Minor defect

A minor defect refers to a defect which is not considered to be able substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation.

Notes: If the LCD/LCM 's cosmetic and display performance do not specify in "inspection criterion", it should be based on these delivered samples.

## 10.3.Sampling & Acceptable Quality Level

Level II, MIL-STD-105E

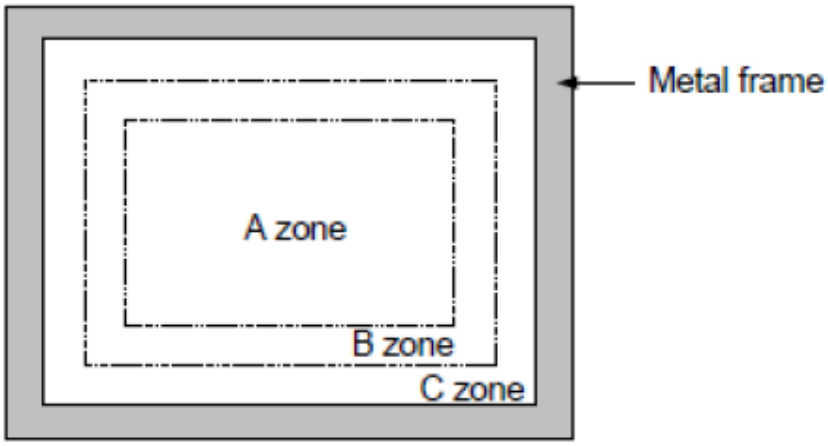
| | Major | Minor |
|---|---|---|
| Cosmetic | 0.4 % | 1.0 % |
| Electrical-display | 0.15% | 0.15 % |

## 10.4.Definition of Inspection Area

A is the Active Area of the display (dot area)

B is the Viewing Area.

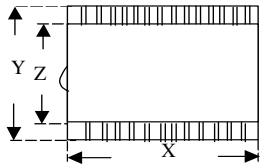
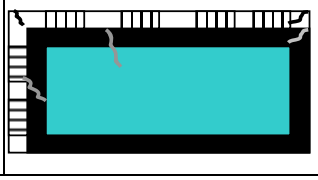
C is the Area between B zone and metal frame.



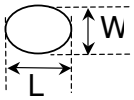
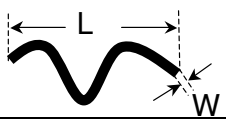

## 10.5.Items and Criteria

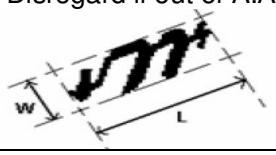
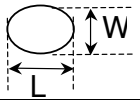
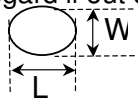
### 10.5.1Visual inspection criterion in cosmetic of LCD

(1) Glass defect

| No | Defect | Criteria | Remark |
|---|---|---|---|
| 1 | Dimension (Minor) | By engineering diagram |   |
| 2 | Cracks (Major) | Extensive crack 【Reject】 |  |

(2) LCM appearance defect

| No | Defect | Criteria | | Remark |
|---|---|---|---|---|
| 1 | Round type (Minor) | Spec. | Permissible Q'ty | 1. $\phi$ =(L+W)/2, L: Length, W: Width<br>2. Disregard if out of A.A.<br>   |
| | | $\phi \leqq$0.15mm | Ignore | |
| | | 0.15mm< $\phi \leqq$0.3mm | 2 | |
| | | 0.30mm< $\phi$ | 0 | |
| 2 | Scratch (Minor) | Spec. | Permissible Q'ty | 1.L: Length, W: Width<br>2. Disregard if out of A.A.<br>   |
| | | W$\leqq$0.01mm | Ignore | |
| | | L$\leqq$5mm and 0.01mm<W$\leqq$0.03mm | 2 | |
| | | L$\leqq$5mm and 0.03mm<W$\leqq$0.05mm | 1 | |
| | | L>5mm or W>0.05mm | 0 | |
| 3 | Fiber | Spec. | Permissible Q'ty | 1.L: Length, W: Width |

| | | | | |
|---|---|---|---|---|
| | (Minor) | W≦1.0mm and L≦1.5mm | 4 | 2. Disregard if out of A.A.  |
| | | W>1.0mm or L>1.5mm | 0 | |
| 4 | Polarizer Bubble (Minor) | Spec. | Permissible Q'ty | 1. $\phi$ =(L+W)/2 , L: Length, W: Width 2. Disregard if out of A.A.  |
| | | $\phi$ < 0.25mm | Ignore | |
| | | 0.25mm≦ $\phi$ ≦0.35mm | 2 | |
| | | 0.35mm< $\phi$ | 0 | |
| No | Defect | Criteria | | Remark |
| 5 | Polarizer Dent (Minor) | Spec. | Permissible Q'ty | 1. $\phi$ =(L+W)/2 , L: Length, W: Width 2. Disregard if out of A.A.  |
| | | $\phi$ < 0.25mm | Ignore | |
| | | 0.25mm≦ $\phi$ ≦0.35mm | 3 | |
| | | 0.35mm< $\phi$ | 0 | |

(3) FPC

| No | Defect | Criteria | Remark |
|---|---|---|---|
| 1 | Copper peeling (Minor) | Copper peeling 【Reject】 | |

(4) Black tape

| No | Defect | Criteria | Remark |
|---|---|---|---|
| 1 | Shift (Minor) | IC exposed 【Reject】 | |
| 2 | No black tape (Minor) | No black tape 【Reject】 | |

(5) Silicon

| No | Defect | Criteria | Remark |
|---|---|---|---|
| 1 | Amount of silicon (Minor) | ITO exposed 【Reject】 | |

(6) Bezel

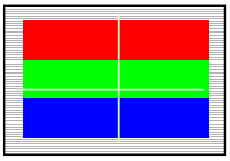
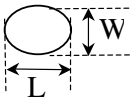
| No | Defect | Criteria | Remark |
|---|---|---|---|
| 1 | Oxidized spot (Minor) | Oxidized spot, rust 【Reject】 | |

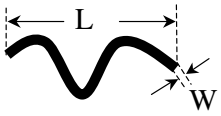
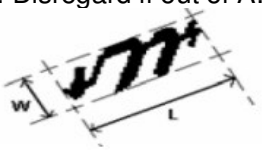
| | | | |
|---|---|---|---|
| 2 | Outline deformation (Minor) | By engineering diagram | |
| 3 | Greasiness (Minor) | Greasiness 【Reject】 | |
| 4 | Spots, round Type (Minor) | H≦By engineering diagram 【Ignore】 | H=Total height (thickness) |
| 5 | Plating (Minor) | Bubble, peeling 【Reject】 | |

(7) Power cord

| No | Defect | Criteria | Remark |
|---|---|---|---|
| 1 | Power cord (Minor) | Power core loose | |

## 10.5.2 Visual inspection criterion in electrical display

| No | Defect | Criteria | | Remark |
|---|---|---|---|---|
| 1 | No display (Major) | Not allowed | | |
| 2 | Missing line (Major) | Not allowed | |  |
| 3 | Darker or lighter line (Major) | Not allowed | | |
| 4 | Bright / Dark point (Minor) | Have to respect Ingenico Criteria described in the ICO-OPE-00649 V4.pdf document | | Have to respect Ingenico Criteria described in the I ICO-OPE-00649 V4.pdf document |
| 5 | Round type (Minor) | Spec. | Permissible Q'ty | 1. $\phi$ =(L+W)/2,<br>L: Length, W: Width<br>2. Disregard if out of A.A.<br>  |
| | | $\phi$ ≦0.15mm | Ignore | |
| | | 0.15mm< $\phi$ ≦0.3mm | 2 | |
| | | 0.30mm< $\phi$ | 0 | |

| | | | | |
|---|---|---|---|---|
| 6 | Line type (Minor) | Spec. | Permissible Q'ty | 1. L: Length, W: Width<br>2. Disregard if out of A.A.<br>  |
| | | W≦0.01mm | Ignore | |
| | | L≦5mm and 0.01mm<W≦0.03mm | 2 | |
| | | L≦5mm and 0.03mm<W≦0.05mm | 1 | |
| | | L＞5mm or W＞0.05mm | 0 | |
| 7 | Fiber (Minor) | Spec. | Permissible Q'ty | 1. L: Length, W: Width<br>2. Disregard if out of A.A.<br>  |
| | | W≦1.0mm and L≦1.5mm | 4 | |
| | | W>1.0mm or L>1.5mm | 0 | |
| 8 | Mura (Minor) | By 1% ND filter invisible | | |

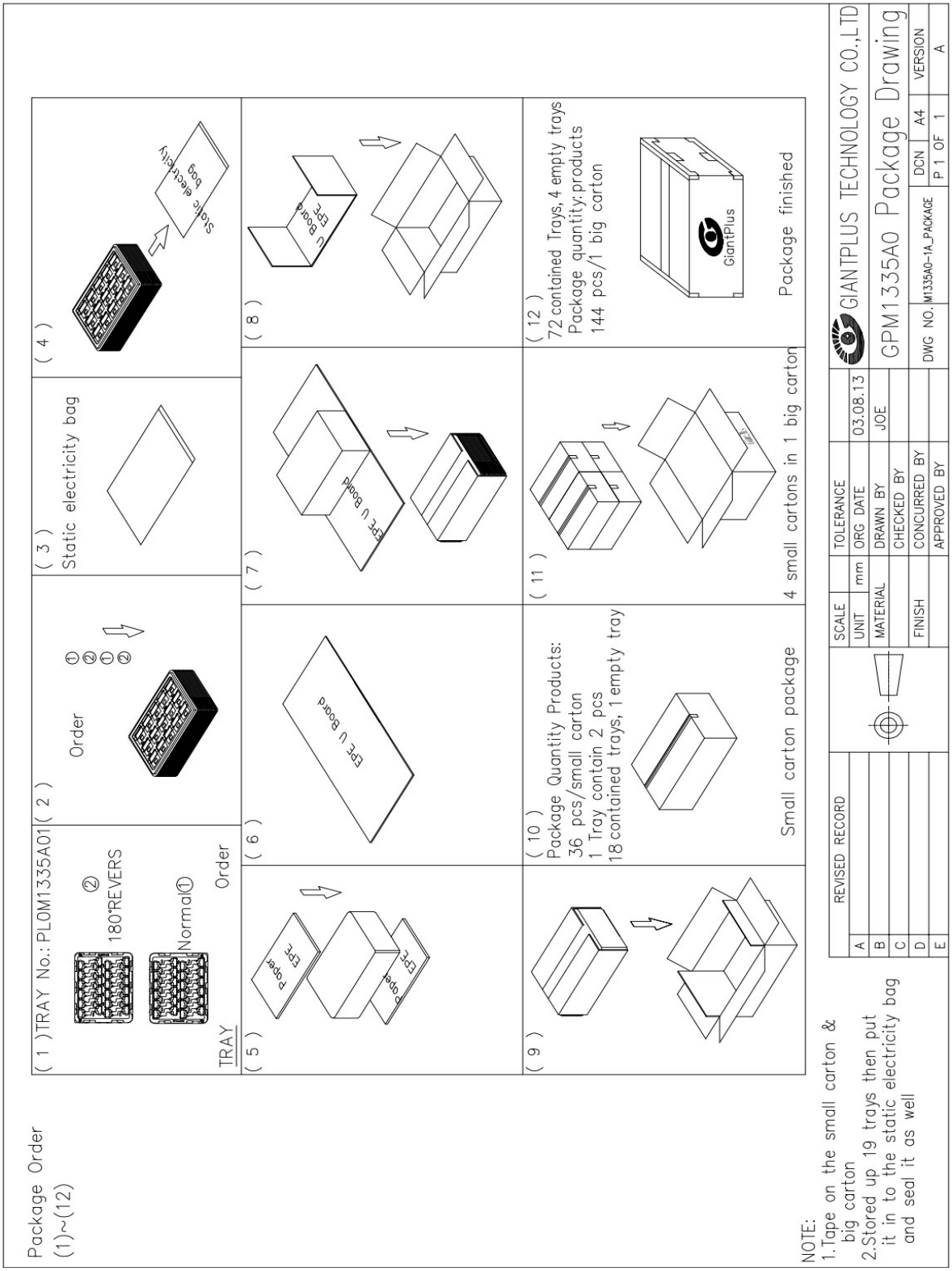
### 10.5.3 Others

1. Issues that are not defined in this document shall be discussed and agreed with both parties. (Customer and supplier)
2. Unless otherwise agreed upon in writing, the criteria shall be applied to both parties. (Customer and supplier)
3. Polarizer, more than 0.5mm in size reduction rejected.

Note.

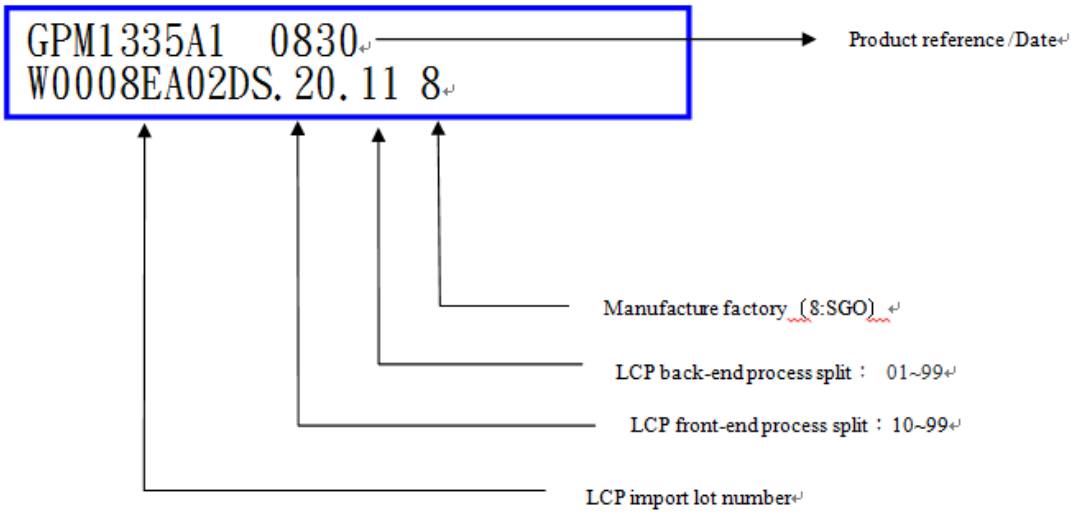
1. All detailed descriptions will be described in "Display_Generic_Specification_ICO OPE 00649 V4.pdf" generic specification.

# 11. Illustration Package Drawing




The display is put into thermoforming tray. Trays have to be designed to prevent any damage on the FPC when picking up the display. Trays have to be ESD proof.

# 12. Illustration of LCD Date code




LCP Import lot number will be released when mass production.

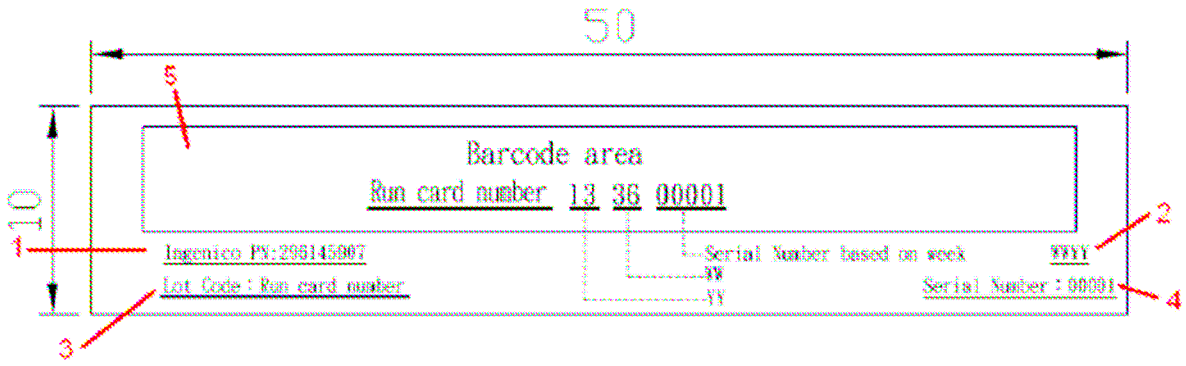
As the drawing mark area “Customer Bar Code Area”:

It’s Label with

- 1. the Ingenico LCD part number (296145907)
- 2. Manifacturing date (WWYY) = week and year(4 digits)
- 3.lot code

  Example: W0008EA02DS. 20. 11 8

  “8” : Manufacture factory – SGO (Shenzen, China factory)
- 4.Unique Serial number(Unique for each Week): alphanumeric (5 digits)
- 5.”Lot Code+Year+week+ Unique Serial number”: Bar Code (type 128)



# 13. RoHS2 & REACH COMPLIANT WARRANTY

## 13.1. RoHS2 Hazardous substances including:

- Cd< 100 ppm
- Pb< 1000 ppm
- Hg< 1000 ppm
- Cr +6 < 1000 ppm
- PBDE < 1000 ppm
- PBB < 1000 ppm

Giantplus has to provide a RoHS2 certificate of compliance.

## 13.2. REACH compliancy

All detailed descriptions will be described in “Declaration letter of REACH compliancy” signed by Glantplus and Ingénico”.

Giantplus has to provide a REACH certificate of compliance.

# 14. PRECAUTIONS FOR USE

## 14.1. Safety

(1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.

(2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.

(3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

## 14.2. Storage Conditions

1. Store the panel or module in a dark place where the temperature is 23±5℃ and the humidity is below 50±20%RH.
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.
6. Do not exposed to direct sun light of fluorescent lamps.

## 14.3. Installing LCD Module

Attend to the following items when installing the LCM.

(1) Cover the surface with a transparent protective plate or touch panel to protect the polarizer and LC cell.

(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ±0.1mm.

### 14.4.Precautions For Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (Vo). Adjust Vo to show the best contrast.
(2) Driving the LCD in the voltage above the limit will shorten its lifetime.
(3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.
(4) When turning the power on, input each signal after the positive/negative voltage becomes stable.
(5) Do not apply water or any liquid on product, which composed of T/P.

### 14.5.Handling Precautions

(1) Avoid static electricity, which can damage the CMOS LSI; please wear the wrist strap when handling.
(2) The polarizing plate of the display is very fragile. so, please handle it very carefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface; it may cause display abnormal .
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.
(9) Do not apply water or any liquid on product, which composed of T/P.

### 14.6.Warranty

(1) The period is within 12 months since the date of shipping out under normal using and storage conditions.
(2) The warranty will be avoided in case of defect induced by customer.

## 15. FACTORY

For the consideration of mass production convenience, this model will be manufactured in the factory listed below.

FACTORY NAME: GIANTPLUS TECHNOLOGY CO., LTD
FACTORY ADDRESS: No.15 Industrial Rd., Lu-Chu Li, Toufen Town
351 Miao-Li County, Taiwan, R.O.C..
FACTORY PHONE: TEL: 886-37-611-611 FAX: 886-37-613-166

# 16. REVISION HISTORY

| Version | Revise record | Date |
|---|---|---|
| A | Original version | 2013/06/27 |
| B | 1.Change all of the" "Display_Generic_Specification_ICOOPE 00649 V4.pdf"<br>2. Modify the line type and Scratches => L>5mm<br>3. Update the section 12.Illustration of LCD Date code. | 2013/10/1 |